



I-465

FROM SR 67 TO 56TH STREET

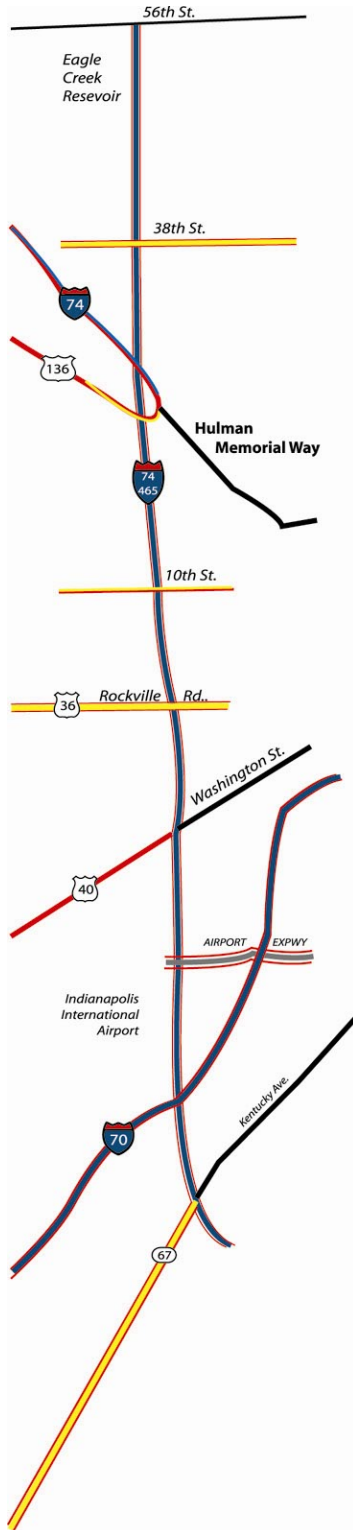
PM_{2.5} QUALITATIVE HOT-SPOT ANALYSIS

Prepared For:



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HNTB

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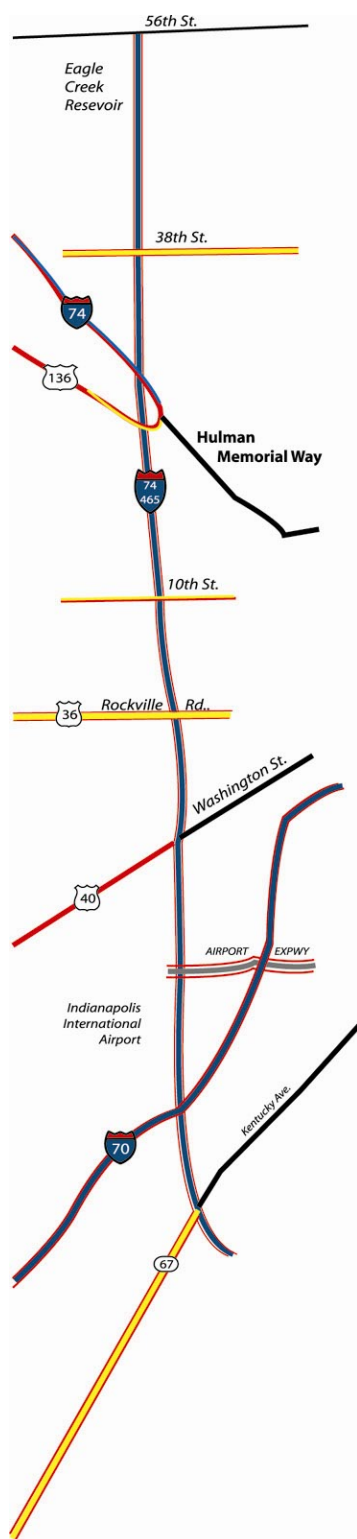
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1. EXECUTIVE SUMMARY



Federally supported highway and transit projects located in nonattainment or maintenance areas are required by section 176(c) of the Clean Air Act to be consistent with (“conform to”) the state implementation plan (SIP). Conforming to the SIP, according to Section 176(c)(1)(B) means that a transportation project, such as the I-465 (West Leg) added travel lanes and interchange modifications (Accelerate 465), will not “cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any required interim emission reductions in any area.”

The Transportation Conformity Rule was amended by the U.S. Environmental Protection Agency (EPA) with the final rule on March 10, 2006. The Amended Transportation Conformity Rule requires a hot-spot analysis to determine project-level conformity in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. The amended rule also stated that qualitative hot-spot analysis would be performed on projects until such time that quantitative procedures are developed. A hot-spot analysis is an assessment of localized emissions impacts from a proposed transportation project and is only required for “projects of air quality concern.”

Preliminary 2015 annual average daily traffic (AADT) data for the southern portion of the project indicated that traffic volumes could increase from a No-Build of 115,000 AADT with 17% trucks to a Build AADT of 141,000 with 17% trucks. Based on this traffic data, it was determined that the Accelerate 465 project was a “project of air quality concern” since it met the definition in 40 CFR 93.123(b)(1)(i) “New or expanded highway projects that have a significant number or significant increase in diesel vehicles.”

An Interagency Consultation Team, comprised of representatives from the Indianapolis Department of Transportation (INDOT), Federal Highway Administration Indiana Division and the Resource Center (FHWA), Indiana Department of Environmental Management (IDEM), Indianapolis Metropolitan Planning Organization (MPO), Indianapolis Department of Public Works (Indy DPW), United States Environmental Protection Agency Region 5 (EPA), United States Federal Transit Administration Region 5 (FTA), Indianapolis transit operator (IndyGo) and INDOT’s consultant, was established to review the project, air quality status in the study area, existing air quality data, existing and future diesel truck volumes, and heavy-duty diesel emission trends to determine whether the Accelerate 465 project meets all the project level conformity requirements.

Based on the qualitative analysis prepared for the Interagency Consultation Team it is determined that the I-465 (West Leg) Added Travel Lanes and Interchange Modifications project meets all the project level conformity requirements, and that the project will not cause or contribute to a new violation of the 24-hour or Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS), or increase the frequency or severity of a violation. Therefore, the project meets the conformity hot-spot requirements in 40 CFR §93.116 and §93.123 for $PM_{2.5}$.



2. INTRODUCTION

Purpose

Federally supported highway and transit projects are required by section 176(c) of the Clean Air Act to be consistent with (“conform to”) the SIP. Conforming to the SIP, according to Section 176(c)(1)(B) means that a transportation project, such as the I-465 (West Leg) added travel lanes and interchange modifications project (Accelerate 465), will not “cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any required interim emission reductions in any area.” The standards referred to in Section 176(c)(1)(B) of the Clean Air Act are the National Ambient Air Quality Standards (NAAQS or “standards” or “criteria pollutants”).

Transportation conformity is required for federally supported transportation projects located in nonattainment or maintenance areas. Nonattainment areas are those regions, cities or portions of cities that have been designated by the EPA as not meeting a NAAQS. Maintenance areas had previously violated air quality standards, but currently meet them and have an approved maintenance plan.

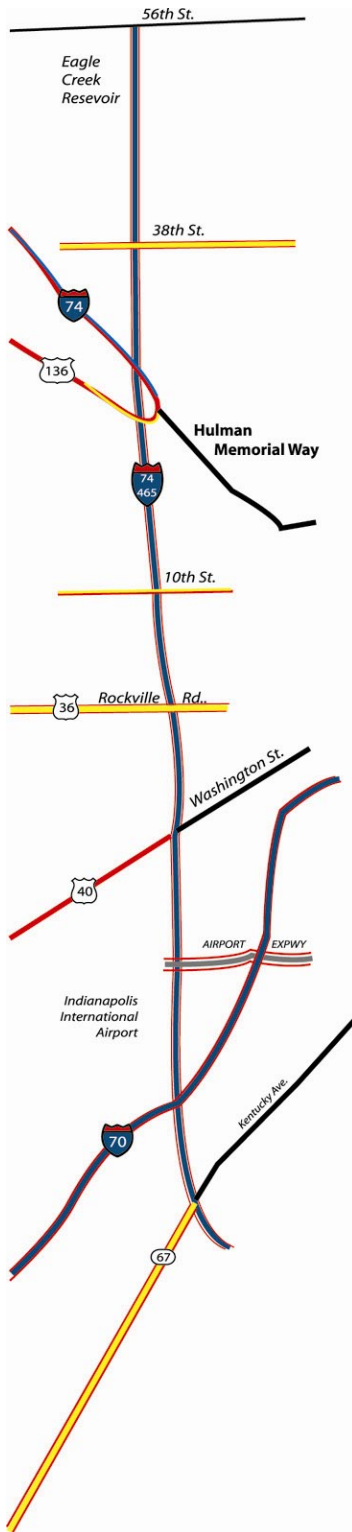
The Transportation Conformity Rule was amended by EPA with the final rule on March 10, 2006 (ref. 1). The Amended Transportation Conformity Rule requires a hot-spot analysis to determine project-level conformity in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. The amended rule also stated that qualitative hot-spot analysis would be performed on projects until such time that quantitative procedures are developed. A hot-spot analysis is an assessment of localized emissions impacts from a proposed transportation project and is only required for “projects of air quality concern.” The March 10, 2006 rule provides examples of “projects of air quality concern,” as well as those that are “not an air quality concern.” The $PM_{2.5}$ and PM_{10} hot-spot requirements in the final rule became effective April 5, 2006. Project level conformity determinations are required pursuant to 40 CFR §93.116. and §93.123. Following the publication of the final rule, the EPA and the FHWA released a conformity guidance manual to aid in the application of the new rule (ref. 2).

This document presents a project description, the air quality status in the study area, existing air quality data, existing and future diesel truck volumes, emission factor trends, and a conclusion that this project will not cause or contribute to a new violation of the $PM_{2.5}$ NAAQS, or increase the frequency or severity of a violation.

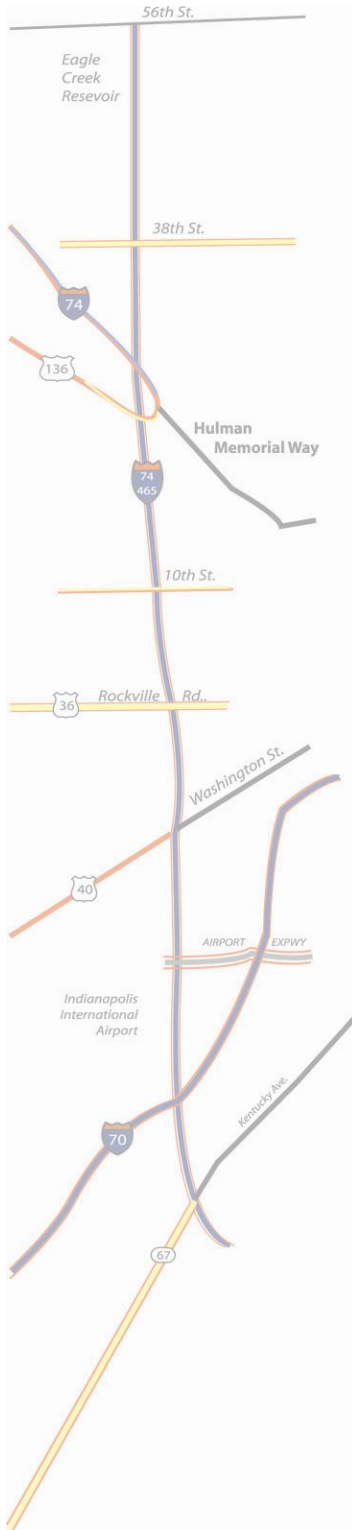
Project Description

The west leg of I-465 is one segment of a 53-mile circumferential highway around Indianapolis, Indiana. The Accelerate 465 study area is approximately 11 miles in length from Mann Road on the south to 56th Street at the northern terminus. I-70 crosses the corridor south of the Indianapolis International Airport, and I-74 travels along the south and west legs of I-465 leaving I-465 near Speedway, Indiana. The study area is shown in Figure 1.

The existing cross section of the I-465 mainline is primarily three lanes in each direction. Between SR 67/Kentucky Avenue and I-70, south of the Indianapolis International Airport, there are four lanes in each direction. Four lanes also exist on southbound I-465 from US 40/Washington Street to the Airport Expressway (ref. 3).



The proposed improvements will include milling and resurfacing the southern one-mile section of the project, from approximately Mann Road to Hanna Avenue north of the SR 67/Kentucky Avenue interchange, retaining the same number of lanes. North of the SR 67/Kentucky Avenue interchange, the proposed project will add an additional through lane in each direction along with auxiliary lanes between interchanges. The seven interchanges within the corridor north of SR 67/Kentucky Avenue interchange will be rebuilt with major design changes including flyover ramps being constructed for the I-70, Airport Expressway, and the I-74 interchanges. The proposed improvements are presented in Appendix A.



3. AFFECTED ENVIRONMENT

Particulate Matter

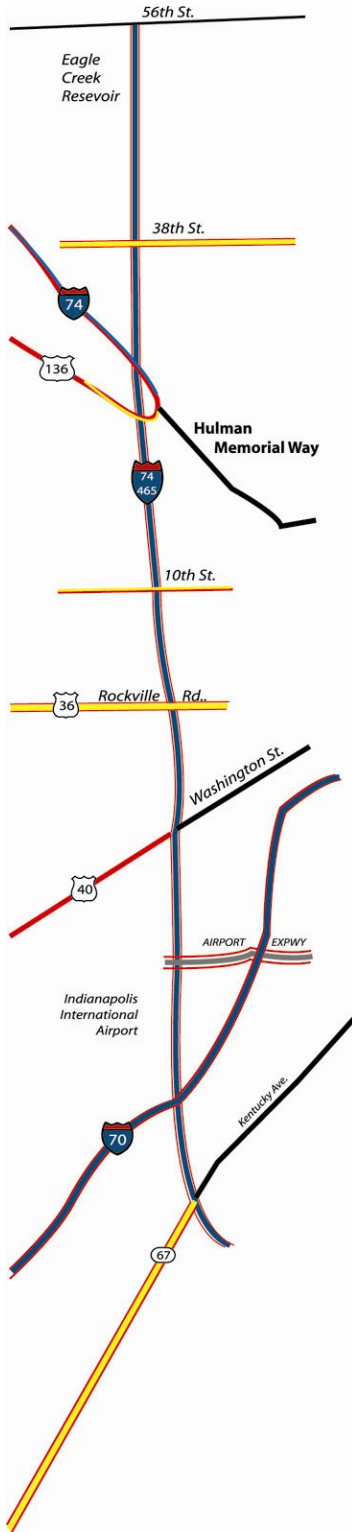
Particulate matter (PM) is the general term used for a mixture of solid particles and liquid droplets found in the air. The very large particulates settle to the ground, while the smaller stay suspended in the air. Some are visible to the naked eye; others require a microscope to be seen. “PM_{2.5} describes the ‘fine’ particles that are less than or equal to 2.5 μm in diameter. ‘Coarse fraction’ particles are greater than 2.5 μm , but less than or equal to 10 μm in diameter. PM₁₀ refers to all particles less than or equal to 10 μm in diameter” (ref. 4). Even though PM₁₀ can be inhaled, PM_{2.5}, due to its small diameter (approximately 1/30th the average width of a human hair), is believed to pose the greatest health risk (ref. 5). Road dust and soot from wood combustion are referred to as “primary” particles, as they are emitted directly into the atmosphere. Particulates that form in the atmosphere from primary gaseous sources are referred to as “secondary” particulates. Examples of secondary particulates include “sulfates, formed from SO₂ emissions from power plants and industrial facilities, and nitrates, formed from NO_x emissions from power plants, automobiles, and other types of combustion sources. The chemical composition of particles depends on location, time of year, and weather. Generally, coarse PM is composed largely of primary particles and fine PM contains many more secondary particles” (ref. 6).

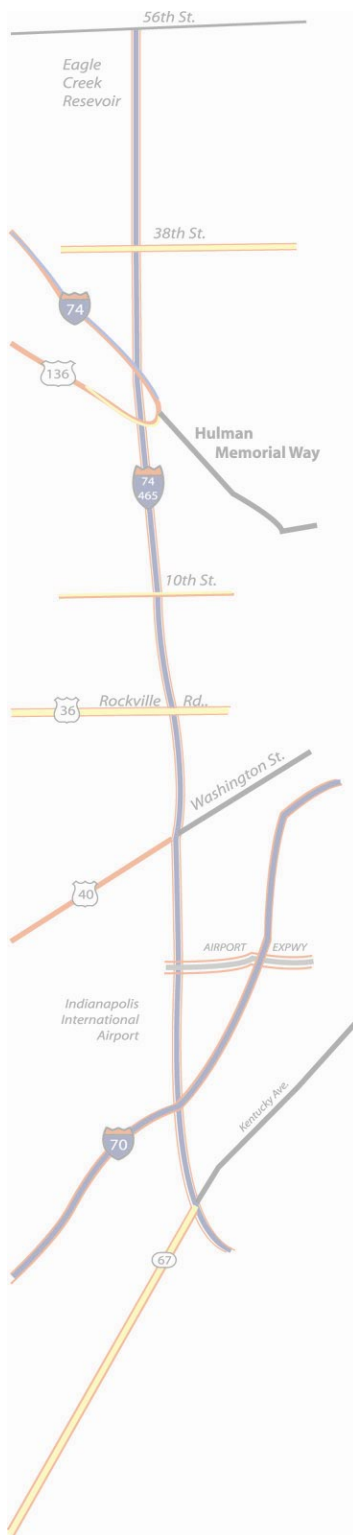
The NAAQS for PM₁₀ includes an annual standard (50.0 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)) and a 24-hour standard (150 $\mu\text{g}/\text{m}^3$). The NAAQS for PM_{2.5} includes an annual standard of 15.0 $\mu\text{g}/\text{m}^3$ and a 24-hour standard of 65 $\mu\text{g}/\text{m}^3$. The PM secondary (welfare-based) standards have been revised by making them identical to the primary standards. EPA believes that the PM_{2.5} and PM₁₀ standards, combined with the Clean Air Act-required regional haze program, will provide protection against the major PM-related welfare effects, including visibility impairment, soiling and materials damage.

The Accelerate 465 project is located within the Indianapolis Intrastate Air Quality Control Region (AQCR #81). Marion County is currently in attainment status for five of the seven criteria pollutants, and has been classified as being in non-attainment for PM_{2.5} and classified as being in basic nonattainment for the 8-hour ozone standard.

The IDEM operates 30 particulate air monitoring sites in the state. Seven of the monitoring sites are located in Indianapolis, Figure 2. The monitoring objective for all seven sites is population exposure. In addition to the population exposure, two of the sites, 2 and 3, are located specifically for sources within industrial and commercial land uses. Site 1 is located in a less developed almost rural area and is considered to be a background site with the city upwind of the site. The remainder of the sites, 4, 5, 6 and 7, are all located in residential neighborhoods. Sites 1 and 5, being only three to three and one-half miles from the west leg of I-465, are the closest sites to the Accelerate 465 study area. 24-hour data from the seven (7) monitoring sites are presented in Table 1. None of the monitors exceeded the 24-hour 65 $\mu\text{g}/\text{m}^3$ NAAQS for PM_{2.5}. The PM_{2.5} yearly annual means and the three year design values for each site, where data is available are presented in Table 2.

Generally, it is believed that the majority of the PM_{2.5} in the study area is very similar to other areas of the State of Indiana being comprised of background concentrations slightly elevated by typical city sources and transportation. The residential sites in Indianapolis are only a couple of $\mu\text{g}/\text{m}^3$ higher than Site 1, which is located in a more rural area. The two sites located in industrial and commercial areas are typically two to three $\mu\text{g}/\text{m}^3$ higher than Site 1.





Three to five years of data is not sufficient to establish accurate trends. However, data in Table 1 and 2 indicates that $PM_{2.5}$ concentration levels increased in 2005 over previous years. This also happened in other areas of Indiana. Data through November 2006 indicates a slight decrease in concentrations. Depending on the areas of the state, these variations could be created by different sources. At this time there is much to be learned about what is causing the fluctuations in $PM_{2.5}$ concentration levels (ref. 7).

The McKenzie Career Center location, Site 7, is less than 0.5 miles east of the I-465 East Leg. The latest INDOT AADT published data, 2002, indicates that traffic on the segment of I-465 nearest Site 7 is greater than traffic volumes along the West Leg of I-465 in the *Accelerate 465* study area (ref. 8). Examination of Table 2 indicates that in 2003 and 2004 Site 7 had annual values below $15 \mu g/m^3$ and only 0.2 to $0.5 \mu g/m^3$ above Site 1. Site 7 is one of only two sites that have shown decreasing trend in 3-year values from 2000-02 through 2003-05. Unless the $PM_{2.5}$ annual concentration for 2006 increases from the present $12.1 \mu g/m^3$ value to $14.6 \mu g/m^3$, the declining trend will continue and Site 7 could be below the three year average annual standard of $15 \mu g/m^3$. Since Site 7 is the closest particulate monitoring site to I-465, it is considered to be the most representative site for air quality in the vicinity of the *Accelerate 465* project corridor.



4. QUALITATIVE ANALYSIS

Interagency Consultation

Preliminary 2015 traffic data for the southern portion of the Accelerate 465 project indicated that traffic volumes could increase from a No-Build of 115,000 AADT with 17% trucks to a Build AADT of 141,000 with 17% trucks (ref. 9). In 2030 Build AADT would be 176,000 with 17% trucks (ref. 10). Based on this traffic data, it was determined that the Accelerate 465 project was a “project of air quality concern” since it met the definition in 40 CFR 93.123(b)(1)(i) “New or expanded highway projects that have a significant number or significant increase in diesel vehicles” (ref. 11).

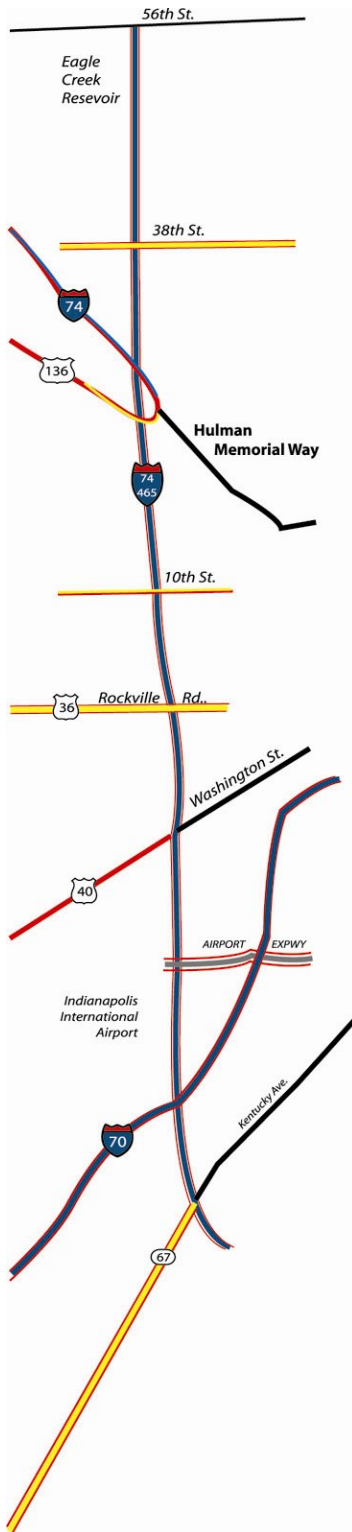
The interagency consultation began on October 6, 2006, with a meeting at INDOT’s headquarters. Agencies who could not attend the meeting joined via telephone. Agencies participating that day included INDOT, FHWA, IDEM, MPO, Indy DPW, EPA, and INDOT’s project consultant. The FHWA Resource Center responded to the meeting invitation that a representative could not attend. Representatives of the FTA and IndyGo did not participate in the first meeting. The air quality study approach was determined to be the most applicable to this hot-spot analysis. The qualitative analysis methodology agreed upon was to present projected traffic data, present trends in heavy duty diesel truck emission rates, and present regional particulate data. Construction is scheduled to begin in 2006 and be completed in 2012. Based upon the proposed construction schedule, the preliminary traffic data and the projected decrease in diesel truck PM_{2.5} emissions, it was agreed that the year of peak emissions would be 2013.

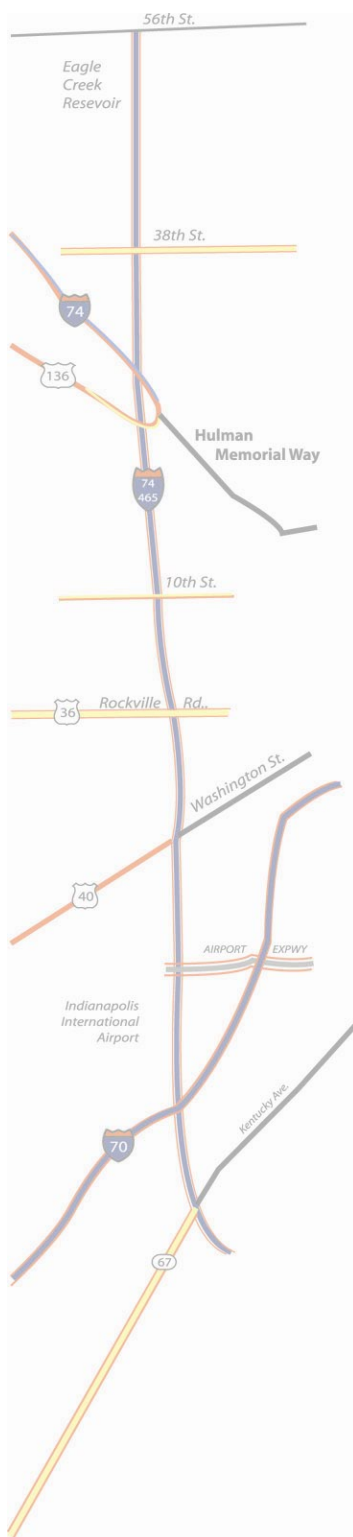
Presently, twelve construction contracts are projected to be let at various times during the six-year construction period. More than one contract may be let in a specific area of the project, but none of the contracts are projected to last more than three and one-half years. Neither the EPA nor IDEM has determined that re-entrained road dust is a significant contributor to PM_{2.5} concentrations in Marion County (ref. 12). Therefore, neither re-entrained road dust nor particulate construction emissions will be analyzed in this qualitative hot-spot analysis.

Traffic Data

The Environmental Assessment for Accelerate 465 states that traffic volume in the study corridor is projected to increase from 53% to 77%, depending on the segment, from 1998 through 2026 (ref. 13). Level of service (LOS) along the corridor operated at LOS E during parts of the day in 1998. Without the proposed improvements the LOS will continue to degrade such that by 2026 LOS F will become common along the corridor (ref. 14). The Accelerate 465 project will increase capacity along the corridor resulting in peak hour LOS improvements into the C and D range (ref. 15).

The Interagency Consultation Team requested that the MPO re-model the study area such that the MPO’s No-Build alternative only deleted the proposed improvements to the Accelerate 465 project corridor, not all the projected projects within the region. The MPO fulfilled this request and provided Build and No-Build traffic for the region and the Accelerate 465 project. The travel model used for this analysis was the same model used for the regional conformity determination discussed in the Regional Emission Trends section of this report. The results of Build and No-Build modeling are presented in Table 3.





The data presented in Table 3 confirms that there would be a VMT increase on I-465. The net regional VMT increases by 172,663 (0.3%), while I-465 VMT increases by 336,200 (26%), indicating a net reduction in VMT for non-I-465 links. The MPO explained that it was noteworthy that I-465 VMT does not increase as much as the new capacity provided by the project (6-lanes to 10-lanes, in general, for a 67% capacity increase), so the project still provides a reduction in congestion for the target year (ref. 16).

The MPO also prepared a map showing the VMT delta for the Build vs. No-Build for the year 2013, Figure 3. The green segments on Figure 3 identify roadway segments that are projected to experience an increase in VMT, red a decrease when comparing the Build VMT vs. the No-Build VMT. I-465 shows a heavy positive delta, not only for the project area, but for sections of I-465 connecting into the project area. Radial interstates connecting into I-465 also show a heavy increase outside of I-465, with small reductions inside I-465, suggesting that the Accelerate 465 project is accommodating suburb-to-suburb trips, as well as interregional movements (ref. 17).

Heavy-Duty Diesel Emission Trends

According to EPA, the 2007 heavy-duty engine standards will result in the introduction of new, highly-effective control technologies for heavy-duty engines, beginning in 2007. Particulate matter emission levels are expected to be 90 percent lower on a per vehicle basis than 2000 standards, levels due to the 2007 diesel engine and fuel program. On-Road diesel trucks will implement Ultra-Low Sulfur Diesel (ULSD) in the fall of 2006. As older heavy-duty diesel vehicles are replaced with newer less polluting vehicles, the heavy duty diesel truck fleet emission rate in central Indiana is projected to decrease 79% from January 2010, through January 2030. Heavy-duty diesel vehicle $PM_{2.5}$ emission rates for the study corridor are presented in Table 4.

The major change in $PM_{2.5}$ emission rates is going to occur between 2010 and 2020 at the rate of approximately 7% year. This period of time coincides with the construction of the proposed I-465 improvements, which should be completed in 2013. The estimated decrease in $PM_{2.5}$ emission rates from 2010 through 2013 will be approximately 21%.

Local Air Quality Studies

Two recent research projects have been completed along the I-80/94 corridor in the northwestern corner of Indiana that examined local air quality as affected by highway incidents and moving lane closures. Even though the I-80/94 corridor has 38% greater average daily traffic and double the number of heavy-duty diesel trucks than the Accelerate 465 corridor, the reports are valuable in showing the affect of congestion on $PM_{2.5}$ concentrations adjacent a major transportation corridor. The report on highway incidents observed that it was possible for $PM_{2.5}$ concentrations to increase by 100% during the immediate time period after a peak hour traffic incident (ref. 18).

The second research paper addressed the impacts of moving lane closures. Although this paper did not directly address $PM_{2.5}$ concentrations, it did address $PM_{2.5}$ flux which is the mass transport of $PM_{2.5}$ and accounts for the influence of wind speed on ambient $PM_{2.5}$ concentrations. During the peak congestion created by the moving lane closures, the maximum difference was an increase of 218% (ref. 19).

Regional Emission Trends

Regional mobile source emissions in the nonattainment area are projected by the MPO to decrease by over 50% for $PM_{2.5}$ and over 89% for NO_x emissions from 2002 to 2030. The



The map illustrates the proposed Interstate 74 route through the Indianapolis area. The route is shown as a thick blue line with a red outline, indicating the proposed alignment. Key features include:

- Highways:**
 - I-74:** The main proposed route, running north-south.
 - I-465:** A major north-south corridor to the east of I-74.
 - I-70:** A major east-west corridor running through the city.
 - I-67:** A major east-west corridor running through the city.
 - US-136:** A north-south route to the west of I-74.
 - US-40:** An east-west route crossing I-74.
 - US-36:** A north-south route to the west of I-74.
- Local Roads:**
 - 56th St., 38th St., 10th St., Rockville Rd., Washington St., and Kentucky Ave.** are shown as horizontal or diagonal lines intersecting the main routes.
- Landmarks:**
 - Eagle Creek Reservoir:** Located in the northern part of the map.
 - Indianapolis International Airport:** Located in the southern part of the map.
- Other Labels:**
 - Hulman Memorial Way:** A road branching off to the east from the I-74/I-465 corridor.
 - AIRPORT EXPWY:** A road connecting the airport area to the main routes.

Traffic on the urban interstates in Marion County are projected to create 0.33 tons/day of direct PM_{2.5}, or only 39% of the transportation direct PM_{2.5} emissions in 2010. In 2030 these emissions are projected to decrease to 0.22 tons/day with a slight increase in percentage to 43% of all transportation direct PM_{2.5} emissions (ref. 20).

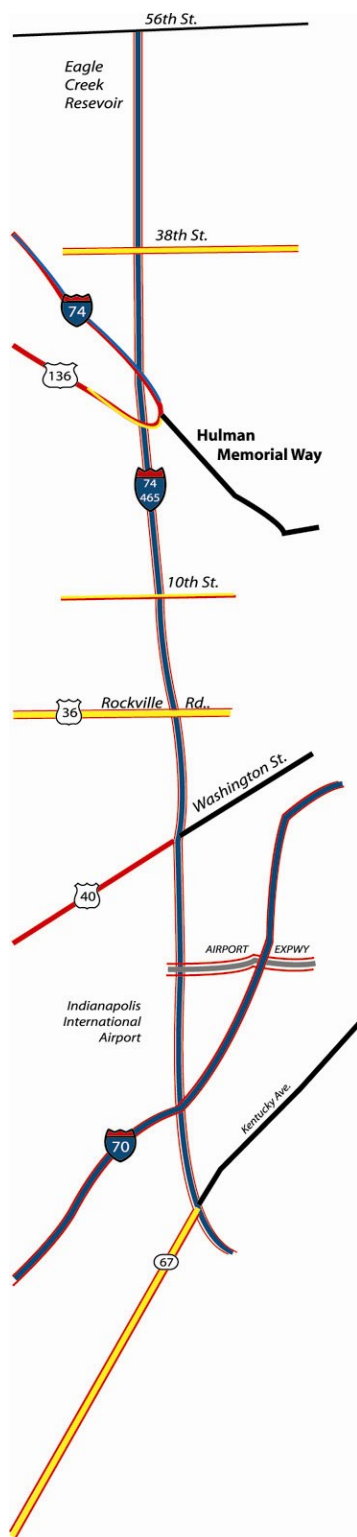


5. REGIONAL CONFORMITY STATUS

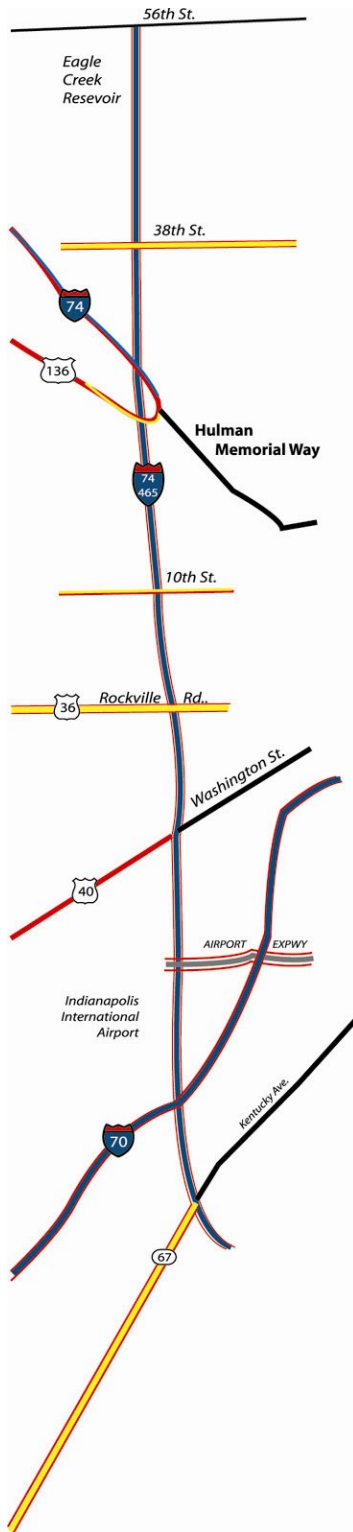
The Accelerate 465 Added Travel Lanes and Interchange Modifications project is included in the Air Quality Conformity Analysis, 2006 Amendments to the Indianapolis 2030 Regional Transportation Plan and 2006-2008 Regional Transportation Improvement Program as MPO ID Numbers 84, 85.1, 86, and 87.

The FHWA and FTA has reviewed the Air Quality Conformity Analysis and has determined that the “conformity analysis of the Indianapolis MPO, 2030 Regional Transportation Plan and 2006-2008 TIPs demonstrate conformity for $PM_{2.5}$ and oxides of nitrogen as precursor to $PM_{2.5}$ as required” by Section 176(c) of the Clean Air Act Amendment and the related requirements of the Final Transportation Conformity Rule (40 CFT Part 51 and 40 CFR Part 93 with respect to $PM_{2.5}$ ” (ref. 23).

EPA has provided guidance on the conformity analysis procedures for $PM_{2.5}$. The $PM_{2.5}$ SIP is due in August of 2008. Approval is expected to take a least one year. The most recent modeling indicates that the Hamilton, Hendricks, Johnson, Madison, and Morgan County nonattainment area should be below the $PM_{2.5}$ standard by 2010 (ref. 24).



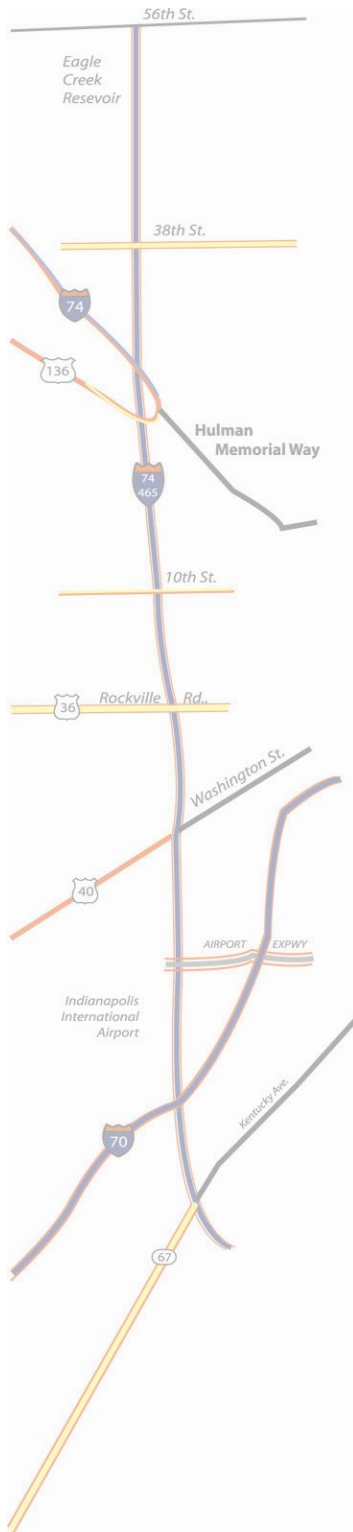
6. CONCLUSION



The qualitative hot-spot analysis for the Accelerate 465 Added Travel Lanes and Interchange Modifications project indicates that:

- IDEM PM_{2.5} monitors have not exceeded the 24-hour NAAQS of 65 µg/m³ from 2000 through the most recent data.
- The IDEM PM_{2.5} monitoring site closest to I-465, Site 7, is gradually approaching a three-year annual average concentration below the PM_{2.5} Annual NAAQS of 15.0 µg/m³.
- I-465 AADT volumes adjacent Site 7 are greater than those on the West Leg of I-465.
- Regional 2013 VMT No-Build vs. Build is projected to increase by 0.3%.
- Due to diversion from other roadway segments and unused capacity on I-465 after completion of the Accelerate 465 Added Travel Lanes and Interchange Modifications project, 2013 Build VMT on I-465 is projected to increase 26% over the No-Build condition.
- PM_{2.5} heavy duty diesel vehicle emission rates are projected to decrease at the rate of 7% per year from 2010 to 2020, resulting in a 21% decrease in emission rates in the three years immediately prior to the completion of the Accelerate 465 Added Travel Lanes and Interchange Modifications project.
- The regional emission analysis for the five county PM_{2.5} nonattainment area indicates that direct PM_{2.5} emissions will decrease 3.3% per year from 2010 to 2020, resulting in a 9.9% decrease in direct PM_{2.5} emissions rates in the three years immediately prior to the completion of the Accelerate 465 Added Travel Lanes and Interchange Modifications project.
- The regional emission analysis for the five county PM_{2.5} nonattainment area indicates that direct PM_{2.5} emissions will decrease 53% from 2002 to 2013, the year of peak emissions for the Accelerate 465 Added Travel Lanes and Interchange Modifications project.
- The regional emission analysis for the five county PM_{2.5} nonattainment area indicates that from 2010 to 2030 daily VMT will increase 23% in Marion County and during that time period emissions of transportation direct PM_{2.5} are projected to decrease 39%.
- In light of the trends in PM_{2.5} concentrations at Site 7, along with the projected decrease in transportation direct PM_{2.5} emissions, it is highly unlikely that future concentrations at Site 7 would cause a violation of the NAAQS.
- Based on the LOS analysis prepared for the I-465 (West Leg) Added Travel Lanes and Interchange Modifications Environmental Assessment, LOS along the corridor operated at LOS E during parts of the day in 1998 and LOS F would become common along the corridor by 2026.
- The Accelerate 465 project would allow peak hour LOS to improve to C and D, depending on the segment of I-465.
- Two air quality studies in northwestern Indiana along the I-80/94 corridor have identified that short term congestion results in significant increases in short term PM_{2.5} concentrations. As stated previously, Accelerate 465 project will improve traffic flow and decrease congestion along the entire study corridor. This will have the effect of reducing 24-hour average concentrations in the vicinity of the project. Also, since these congestion problems currently occur on a daily basis, mitigation of the congestion problems along the corridor will also reduce annual average PM_{2.5} concentrations. The improvements to traffic flow, even though they are focused on





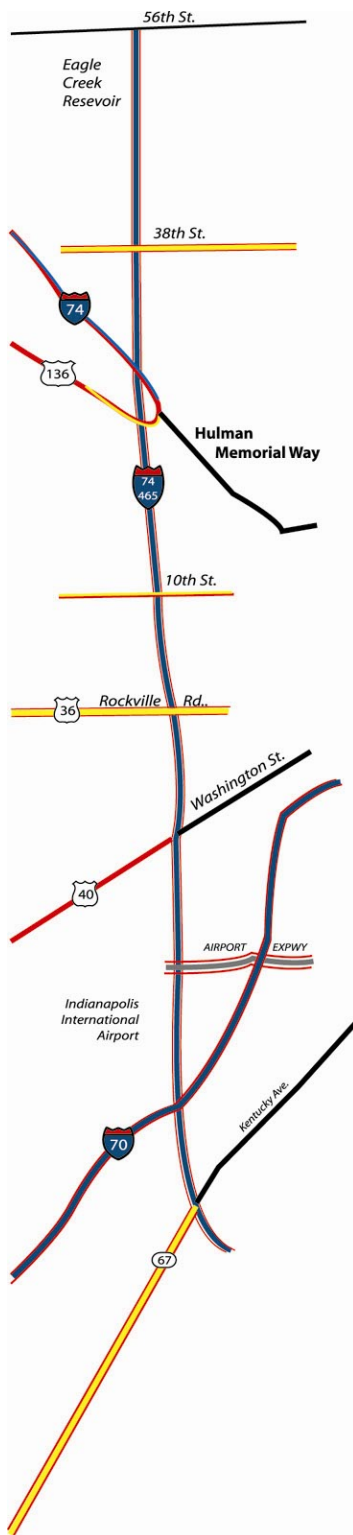
mitigating short-duration congestion problems, will have the effect of reducing daily and annual $PM_{2.5}$ concentrations compared to the no-build alternative. Thus, the Accelerate 465 project will not cause or contribute to a new violation of the $PM_{2.5}$ NAAQS (24-hour standard or annual standard), or increase the frequency or severity of a violation.

- The Air Quality Conformity Analysis for the five county $PM_{2.5}$ nonattainment area has been determined by the FHWA and FTA to be in conformity with the requirements of section 176(c) of the Clean Air Act Amendment and the related requirements of the Final Transportation Conformity Rule (40 CFT Part 51 and 40 CFR Part 93) with respect to $PM_{2.5}$.
- The five county $PM_{2.5}$ nonattainment area is projected to be in attainment for the Annual $PM_{2.5}$ NAAQS of $15.0 \mu g/m^3$ by 2010, three years before the year of peak emissions for the Accelerate 465 Added Travel Lanes and Interchange Modifications project.
- The Air Quality Conformity Analysis for the five county $PM_{2.5}$ nonattainment area includes the proposed improvements making up the Accelerate 465 Added Travel Lanes and Interchange Modifications project.

Based on the qualitative hot-spot analysis and consultation between INDOT, IDEM, MPO, FHWA, and EPA on December 21, 2007, it is determined that the Accelerate 465 Added Travel Lanes and Interchange Modifications project meets all the project level conformity requirements, and that the project will not cause or contribute to a new violation of the 24-hour or Annual $PM_{2.5}$ NAAQS, or increase the frequency or severity of a violation. Therefore, the project meets the conformity hot-spot requirements in 40 CFR §93.116 and §93.123 for $PM_{2.5}$.

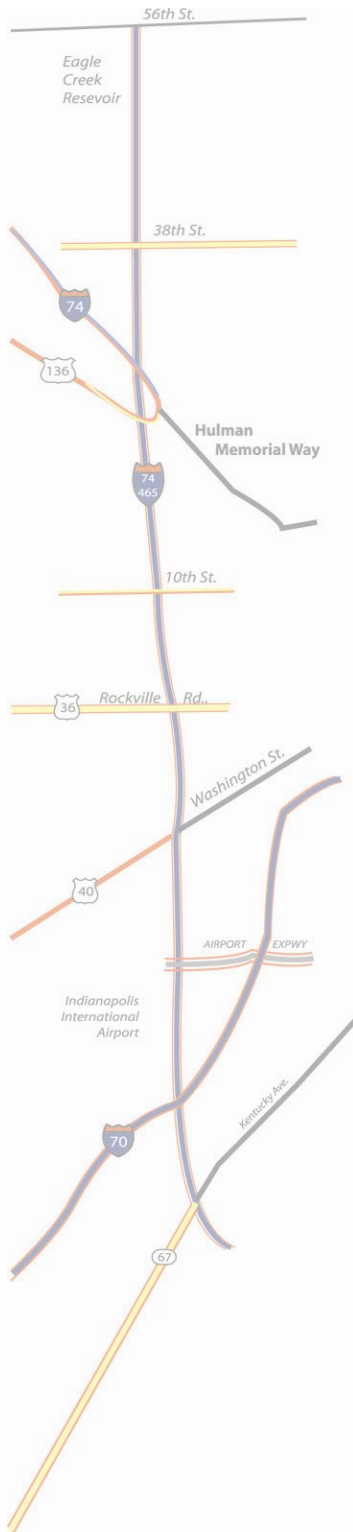


7. REFERENCES



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3. I-465 (West Leg) Added Travel Lanes and Interchange Modifications from South of SR 67 to 56th Street, Marion County, Indiana, Environmental Assessment, Page 1-3, US Department of Transportation/Federal Highway Administration and Indiana Department of Transportation, February 2003.
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13. I-465 (West Leg) Added Travel Lanes and Interchange Modifications from South of SR 67 to 56th Street, Marion County, Indiana, Environmental Assessment, Table 1-1, US Department of Transportation/Federal Highway Administration and Indiana Department of Transportation, February 2003.
14. Ibid, Page 1-2 and Table 1-2.
15. Ibid, Table 2-4.
16. E-mail correspondence, Phillip Roth, Indianapolis MPO, to John Jaeckel, HNTB Corporation, October 12, 2006.
17. Ibid.
18. Impact of Highway Incidents on Local Air Quality, Paper 589, Salimol Thomas, School of Civil Engineering, Purdue University, and Robert B. Jacko, Ph.D, P.E., Professor, School of Civil Engineering, Purdue University.
19. The Impact of Moving Lane Closures on Local Ambient Air Quality, William Schneider IV, Ph.D., Assistant Research Scientist, Texas Transportation Institute, and Robert B. Jacko, Ph.D, P.E., Professor, School of Civil Engineering, Purdue University, presented at the 2005 Annual Air and Waste Management Association Meeting.
20. E-mail correspondence, Sweson Yang, Indianapolis MPO, to John Jaeckel, HNTB Corporation, December 11, 2006.
21. Air Quality Conformity Analysis, Appendix E, Table 7, City of Indianapolis, Department of Metropolitan Development, Division of Planning, February, 14, 2006





22. E-mail correspondence, Sweson Yang, Indianapolis MPO, to John Jaeckel, HNTB Corporation, December 11, 2006.
23. Letter from Robert F. Tally, Jr. P.E., FHWA Indiana Division Administrator to Phelps Klika, Chief, Planning and Production Divisions, Indiana Department of Transportation, March 31, 2006.
24. Telephone conversation, Sweson Yang, Indianapolis MPO, and John Jaeckel, HNTB Corporation, December 11, 2006.



FIGURE 1

Project Location

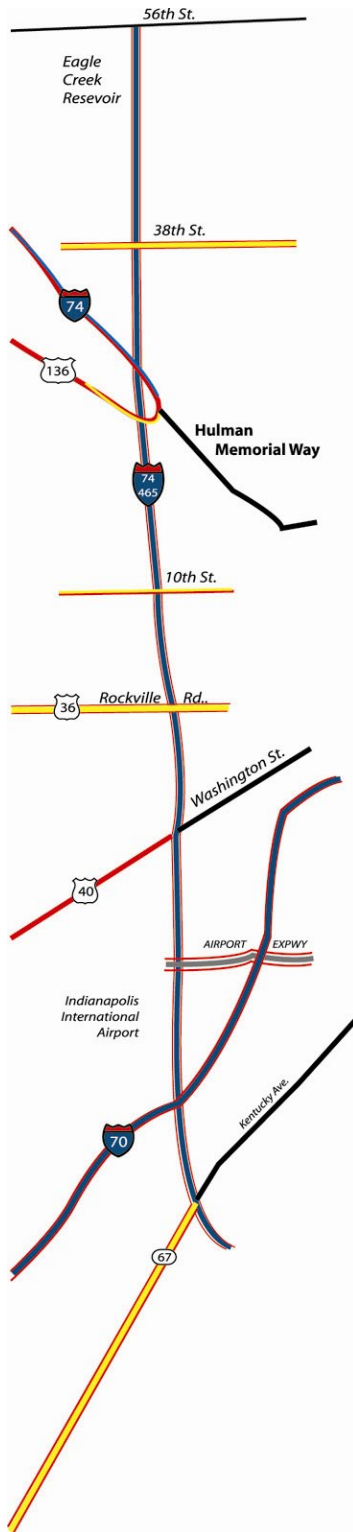




FIGURE 1 – PROJECT LOCATION

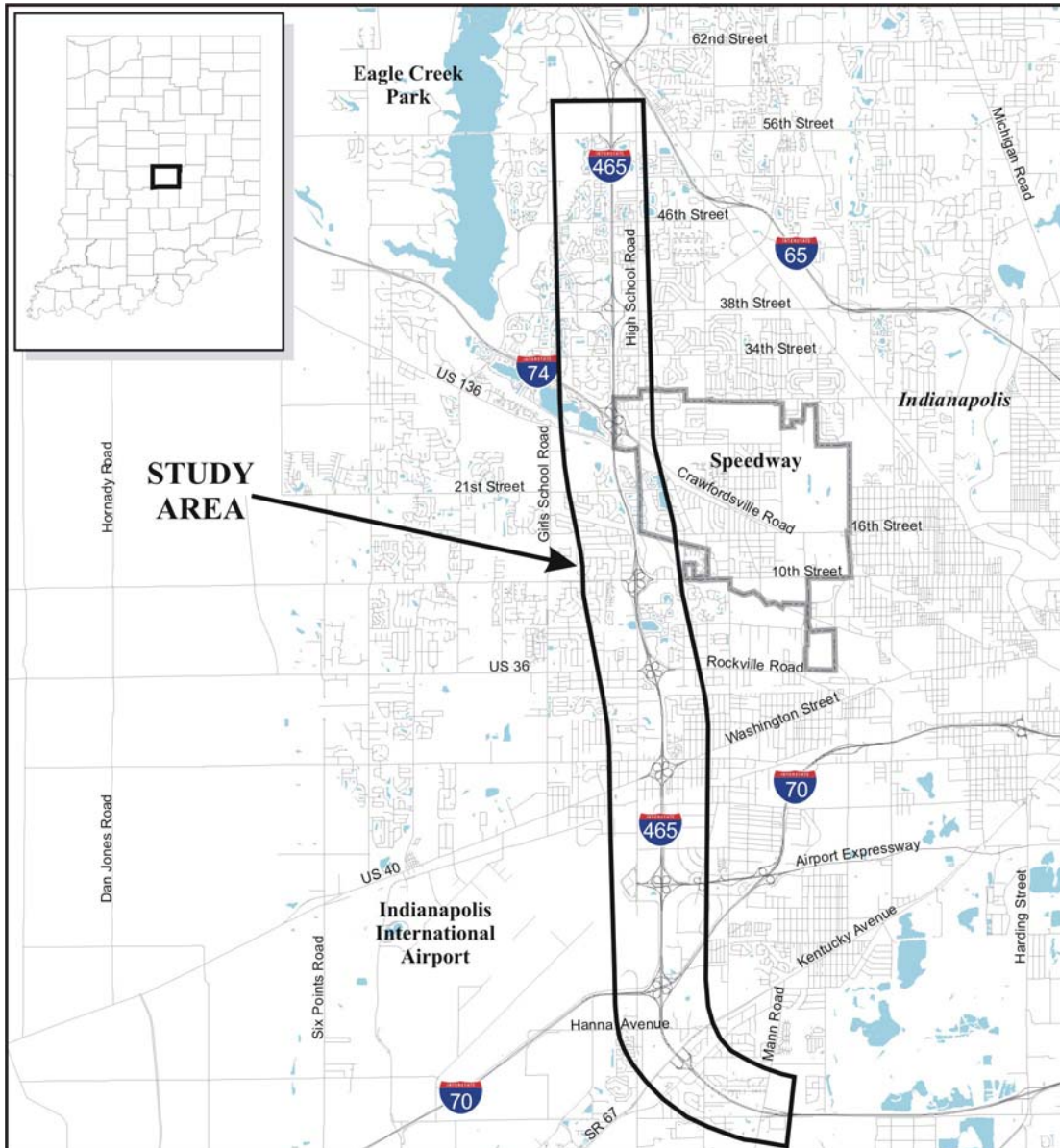
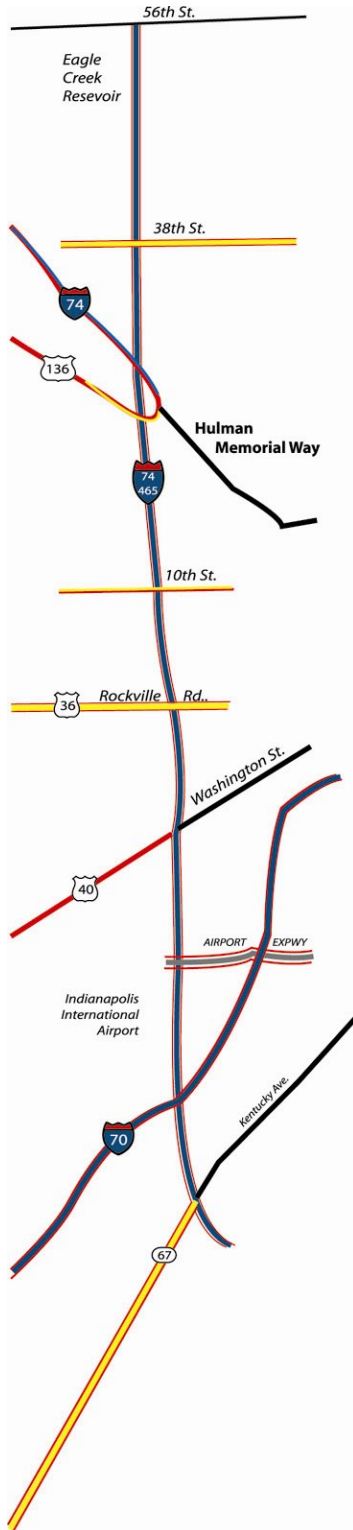


FIGURE 2

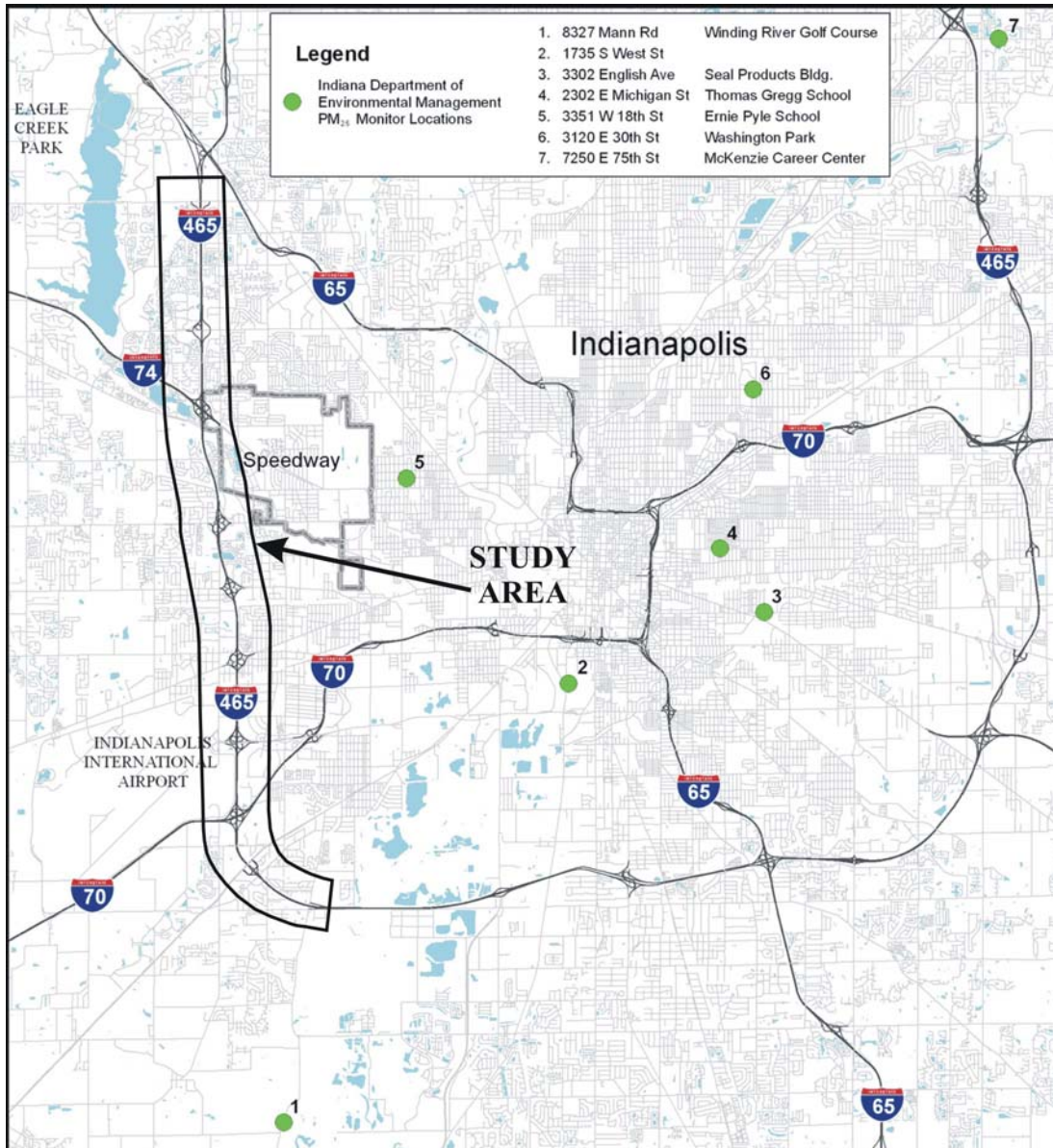


PM_{2.5} Monitors





FIGURE 2 – PM_{2.5} MONITORS



0 3,750 7,500 15,000
Feet

FIGURE 3

I-465 VMT Changes, Build vs. No-Build

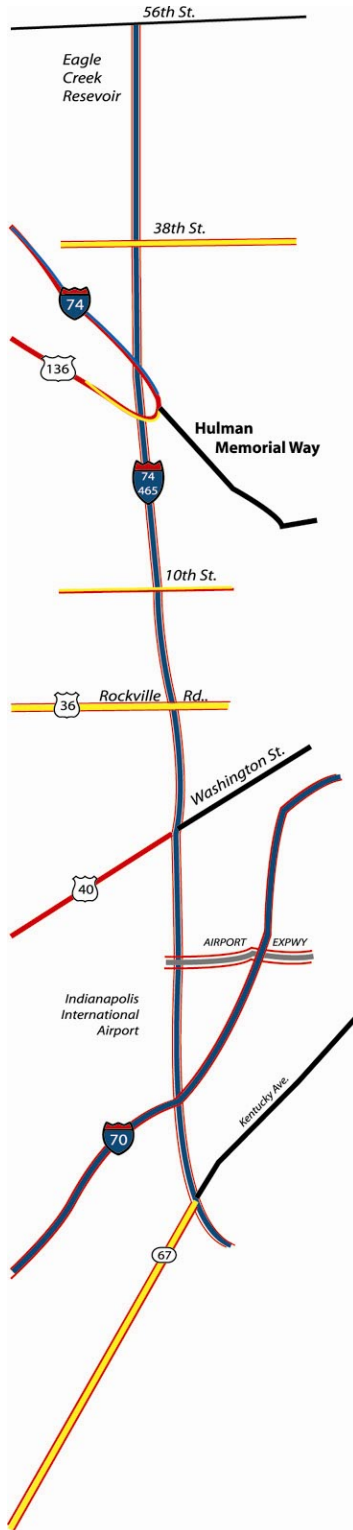




FIGURE 3 – I-465 VMT CHANGES, BUILD VS. NO-BUILD

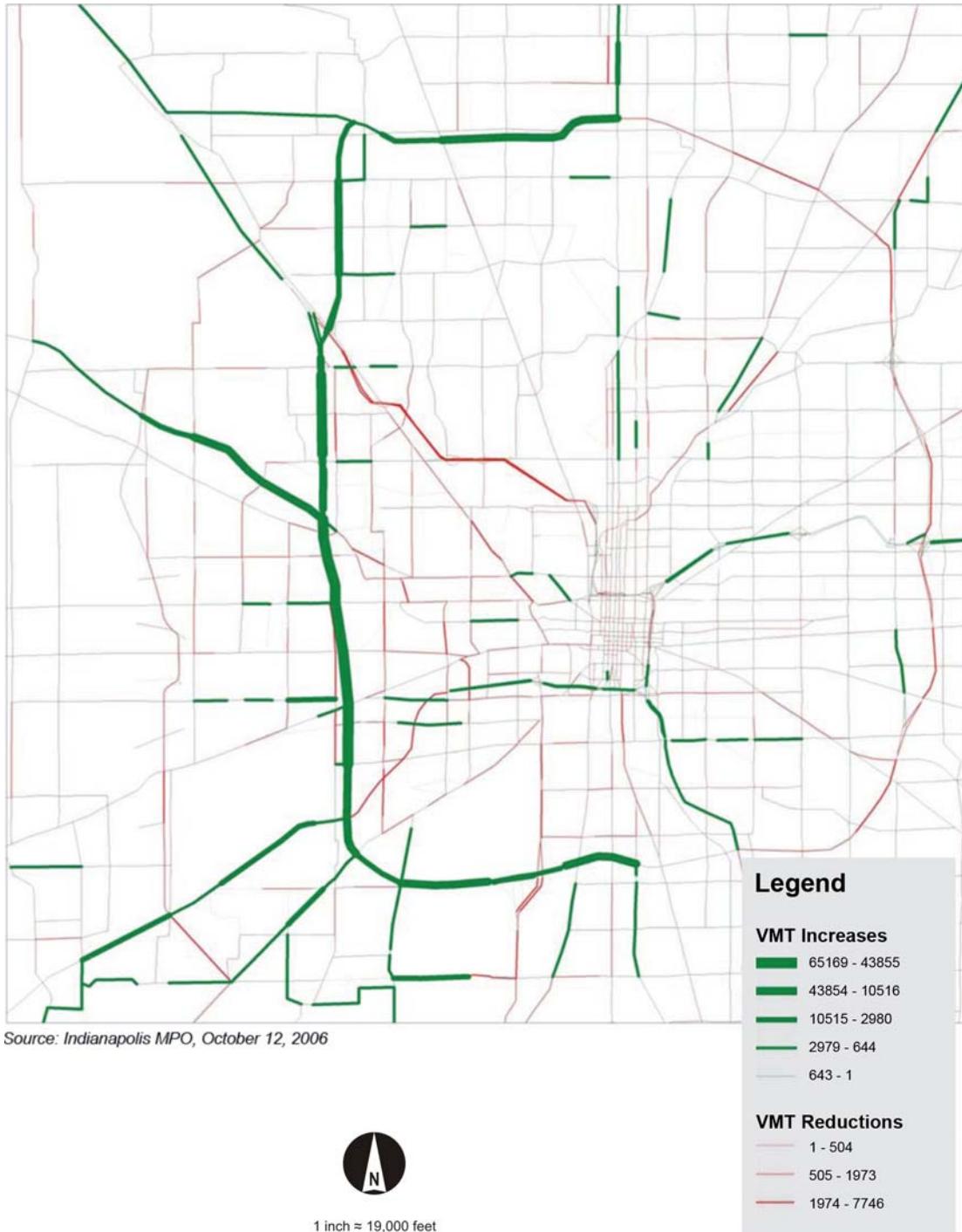


TABLE 1

PM_{2.5} 24 Hour Monitoring Data Summary

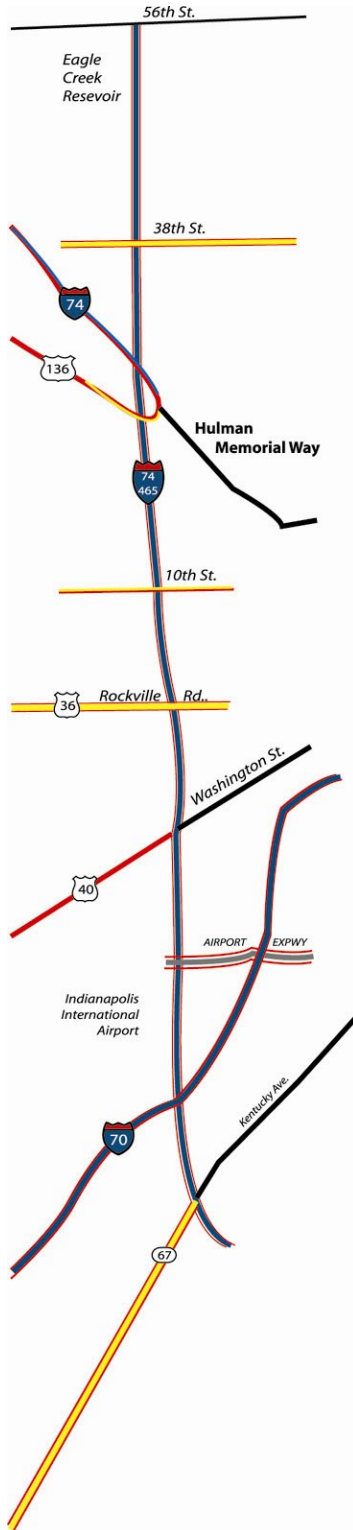




TABLE 1 – PM_{2.5} 24 HOUR MONITORING DATA SUMMARY
Indianapolis, Marion County, Indiana

Site # on Figure 2	Site Name	24-Hour 98th Percent						
		2000	2001	2002	2003	2004	2005	2006 ¹⁾
1	8327 Mann Road, Winding River Golf Course	34	31	40	34	29	39	35
2	1735 South West Street	37	36	37	38	32	44	38
3	3302 English Avenue, Seal Products Bldg.	40	44	45	39	31	44	37
4	2302 E. Michigan Street, Thomas Gregg School	36	40	49	34	31	40	34
5	3351 W. 18th Street, Ernie Pyle School	36	39	28	36	32	46	37
6	3120 E. 30th Street, Washington Park	37	37	35	39	31	43	32
7	7250 E. 75th Street, McKenzie Career Center	35	36	48	38	29	43	33

1) 2006 data is only through November 2006

Value above the annual standard

Note: The 24-Hour Standard is 65.0 micrograms per cubic meter (µg/m³).

Source: <http://www.epa.gov/air/data/> last updated on Monday, December 4, 2006

TABLE 2

PM_{2.5} Annual Monitoring Data Summary

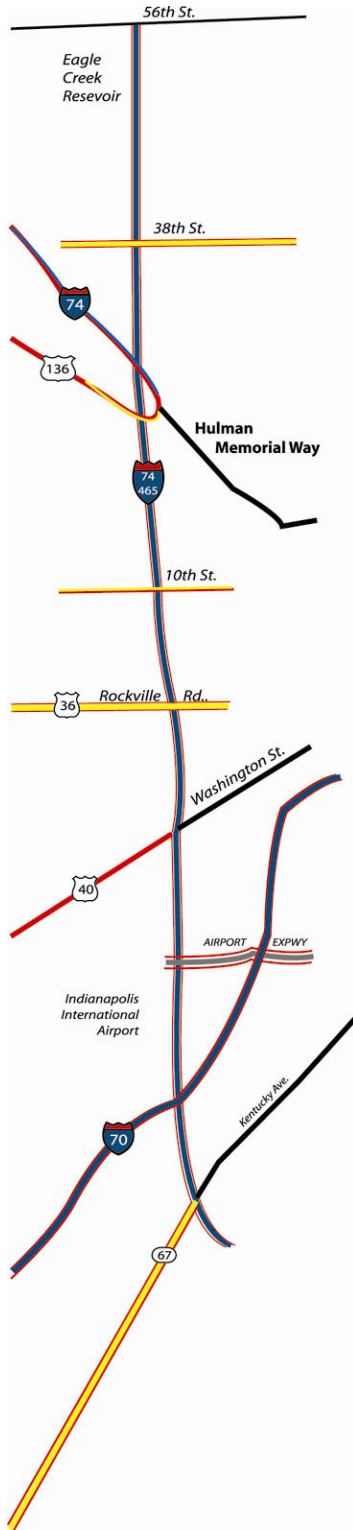




TABLE 2 – PM_{2.5} ANNUAL MONITORING DATA SUMMARY, Indianapolis, Marion County, Indiana

Site # on Figure 2	Site Name	Yearly Annual Means							Three Year Design Values				
		2000	2001	2002	2003	2004	2005	2006 ¹⁾	00-02	01-03	02-04	03-05	04-06
1	8327 Mann Road, Winding River Golf Course	15.2	14.8	15.2	14.5	12.9	16.1	12.0	15.1	14.8	14.2	14.5	²⁾
2	1735 South West Street	18.4	17.7	17.0	17.2	15.7	19.1	14.9	17.7	17.3	16.6	17.3	²⁾
3	3302 English Avenue, Seal Products Bldg.	18.9	18.6	18.4	17.5	16.7	19.4	14.5	18.6	18.2	17.5	17.9	²⁾
4	2302 E. Michigan Street, Thomas Gregg School	17.1	17.1	16.7	14.5	15.0	17.5	13.5	17	16.1	15.4	15.7	²⁾
5	3351 W. 18th Street, Ernie Pyle School	16.7	17.1	14.3	16.2	15.1	17.9	13.5	16	15.9	15.2	16.4	²⁾
6	3120 E. 30th Street, Washington Park	17.8	16.6	16.6	15.5	14.3	16.4	13.5	17.0	16.2	15.5	15.4	²⁾
7	7250 E. 75th Street, McKenzie Career Center	16.4	16.3	17.6	14.7	13.4	16.9	12.1	16.8	16.2	15.2	15.0	²⁾

1) 2006 data is only through November 2006

2) Three-year average for 04-06 has not been calculated, 2006 data not complete.

Value above the annual standard

Note: The Annual Standard is 15.0 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and attainment is determined by the average of the PM_{2.5} values over a three-year period. If a monitor is 15.0 $\mu\text{g}/\text{m}^3$ or higher it is considered nonattainment.

Source: <http://www.epa.gov/air/data/> last updated on Monday, December 4, 2006

TABLE 3

Build and No-Build Vehicle Miles Traveled (VMT)

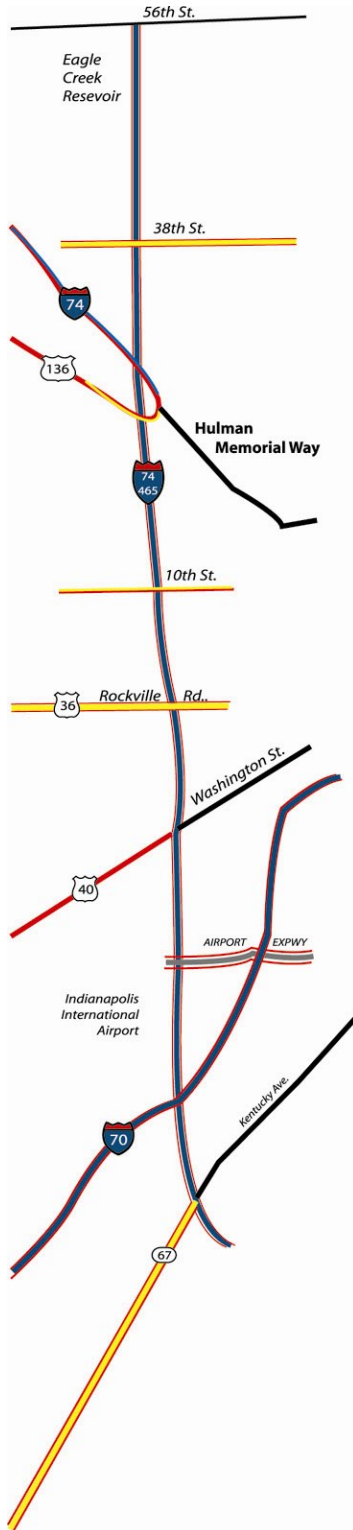




TABLE 3 - Build and No-Build Vehicle Miles Traveled (VMT)

Travel Network	Daily VMT					
	Build Alternative			No-Build Alternative		
	2010	2013	2015	2010	2013	2015
I-465	1,533,142	1,616,300	1,671,739	1,242,376	1,280,100	1,305,249
Region ¹⁾	53,611,950	55,799,878	57,401,654	53,517,227	55,627,215	57,176,393

1) Region consists of the Indianapolis MPO's 9-County Travel Demand Model.

Source: E-mail correspondence, Phillip Roth, Indianapolis MPO, to John Jaeckel, HNTB Corporation, October 12, 2006.

TABLE 4

Heavy-Duty Diesel Vehicle PM_{2.5} Emission Rates

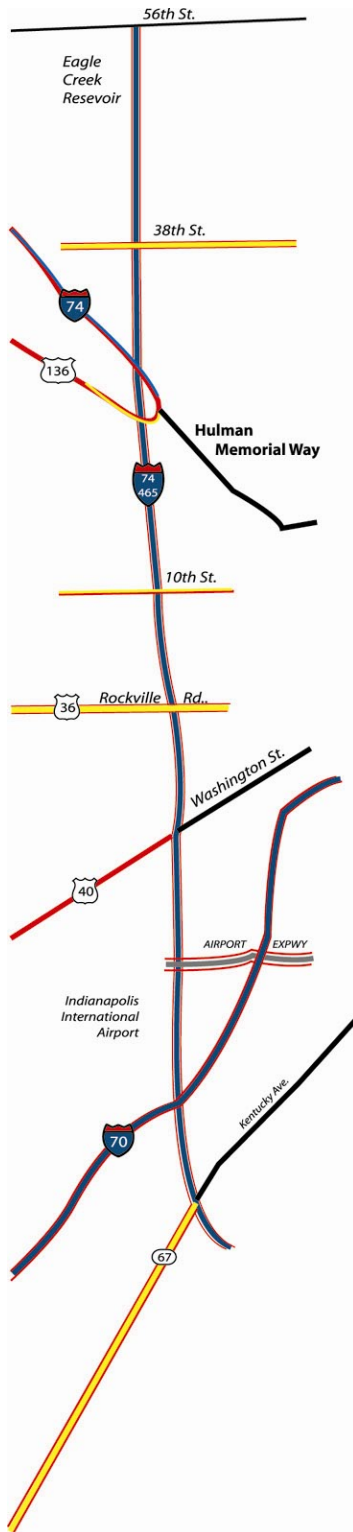




Table 4 – Heavy-Duty Diesel Vehicle PM_{2.5} Emission Rates

	Total PM _{2.5} Heavy Duty Diesel Vehicle Emission Rates, g/mi		
Month	Year		
	2010	2020	2030
January	0.1750	0.0493	0.0360

Source: 2010, Air Quality Conformity Analysis, City of Indianapolis, Department of Metropolitan Development, Division of Planning, February, 14, 2006.
2020 and 2030, E-mail correspondence Sweson Yang, Indianapolis MPO, to John Jaeckel, HNTB Corporation, December 11, 2006.

TABLE 5

**Hamilton, Hendricks, Johnson, Madison and Morgan Counties
Regional Emissions Analysis, Tons/Year**

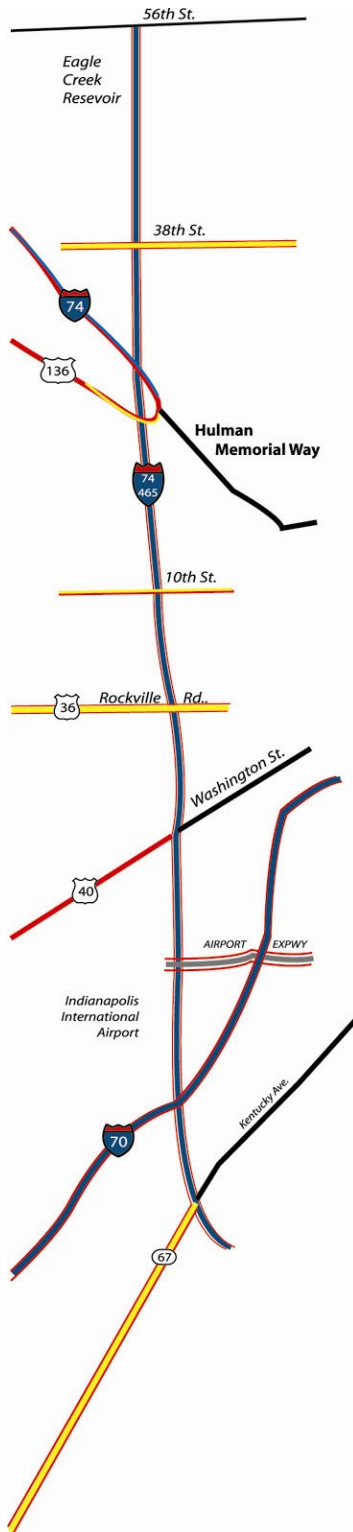




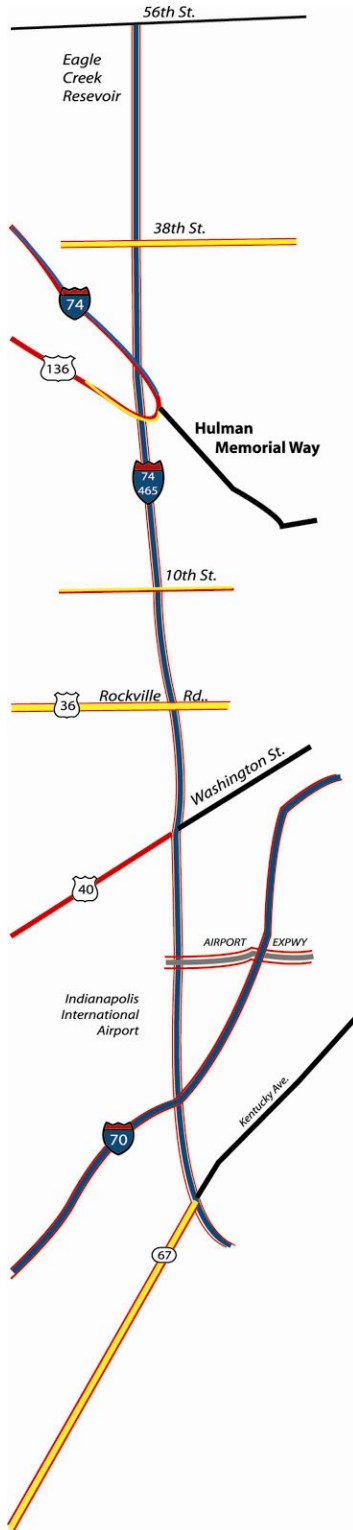
TABLE 5 – Hamilton, Hendricks, Johnson, Madison and Morgan Counties, Regional Emissions Analysis, Tons/Year

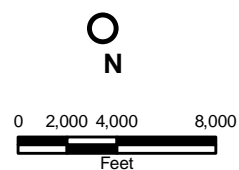
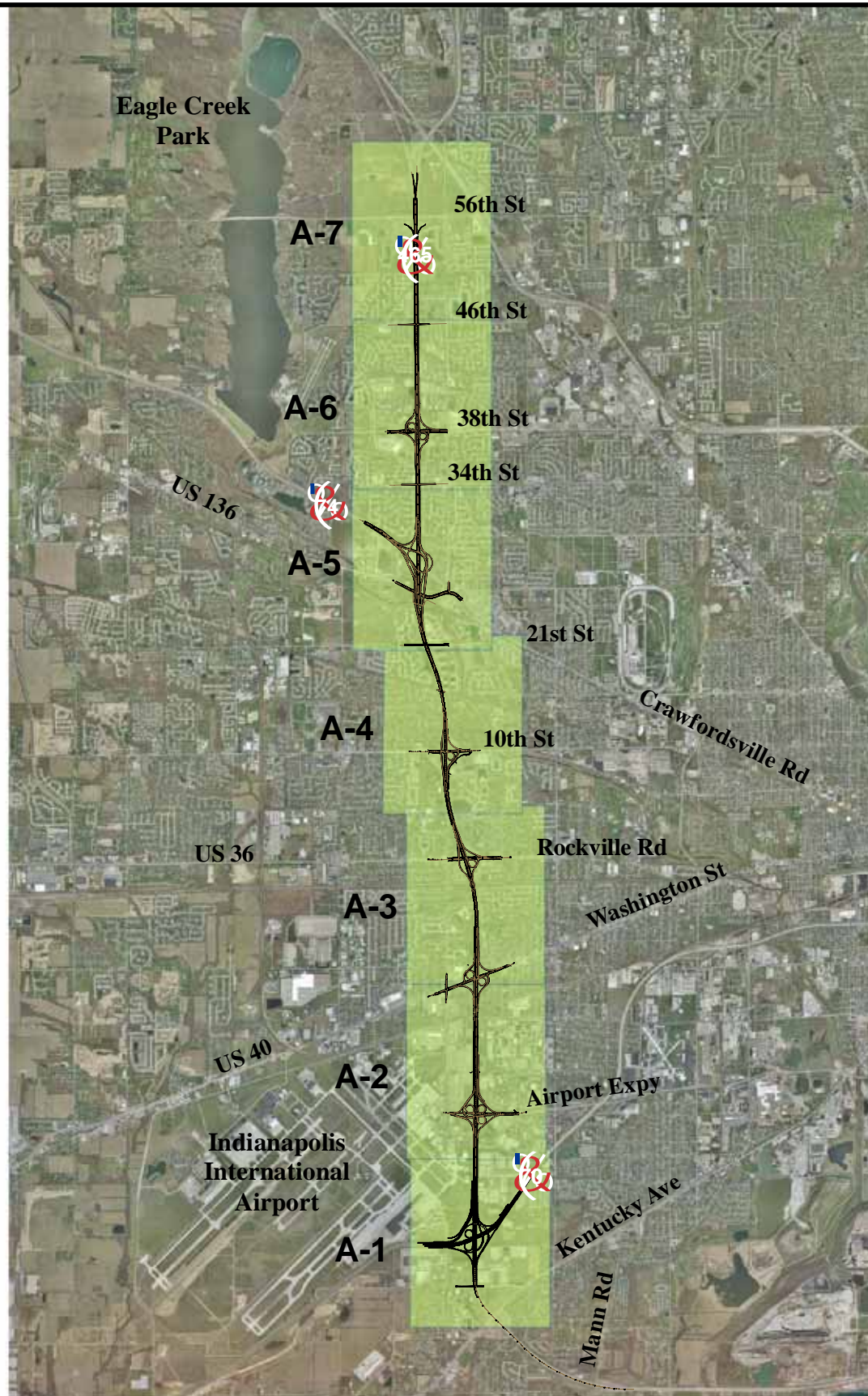
Year	Nonattainment Area	
	Direct PM _{2.5}	NOx
2002	773	43,692
2010	438	23,227
2020	292	10,006
2030	302	7,986

Source: Air Quality Conformity Analysis, City of Indianapolis, Department of Metropolitan Development, Division of Planning, February, 14, 2006.

APPENDIX A

Future Conditions

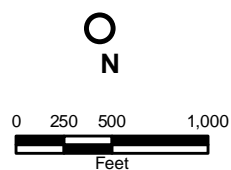




Appendix A Index: Future Conditions PM_{2.5} Qualitative Hot-Spot Analysis

I-465 West Leg Reconstruction Project
(SR 67/ Kentucky Avenue to 56th Street)

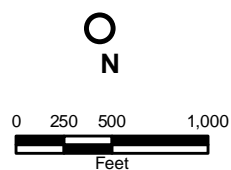
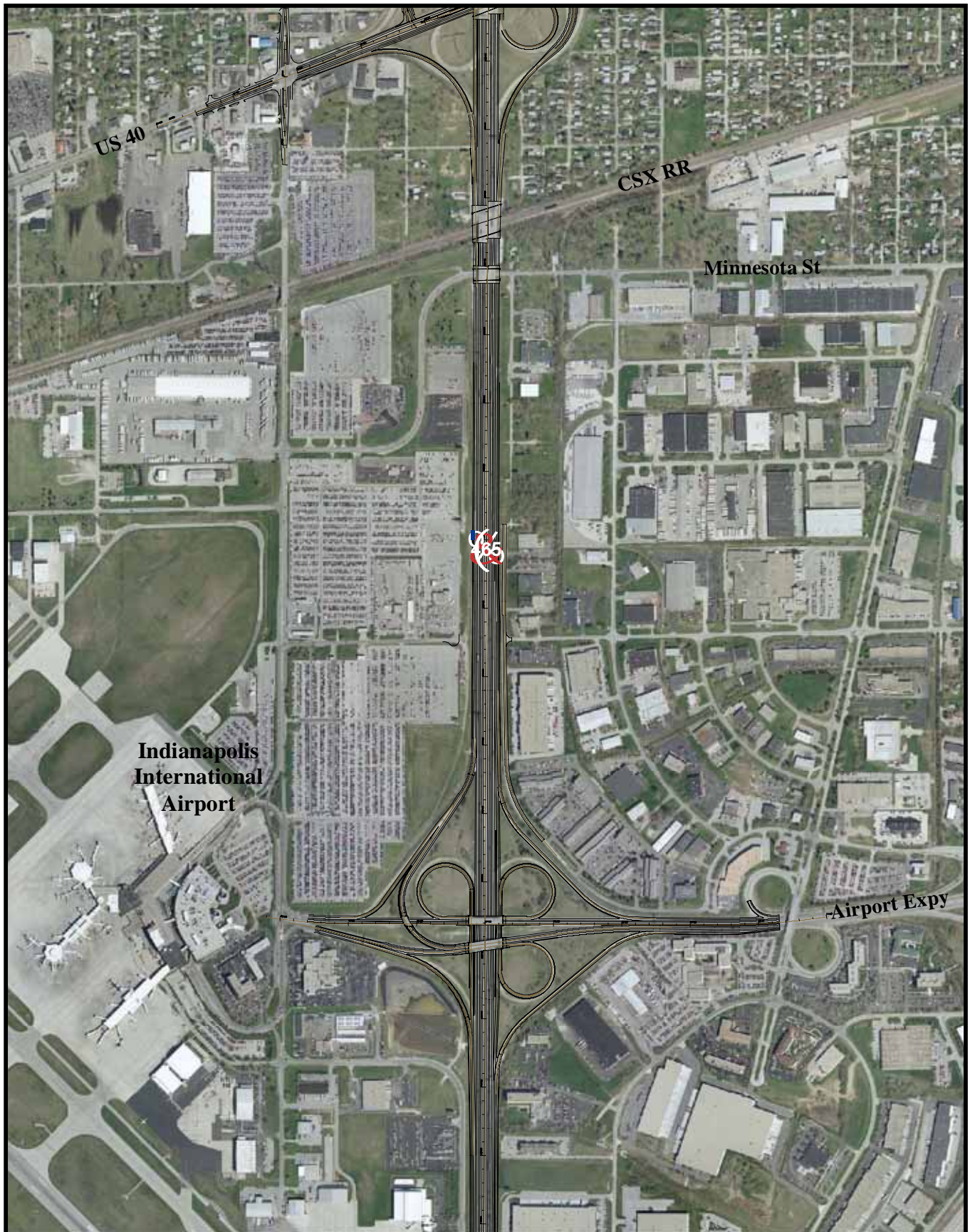
Indianapolis, Indiana



Appendix A - 1: Future Conditions PM_{2.5} Qualitative Hot-Spot Analysis

I-465 West Leg Reconstruction Project
(SR 67/ Kentucky Avenue to 56th Street)

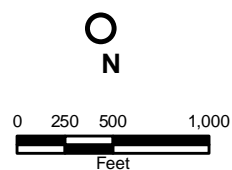
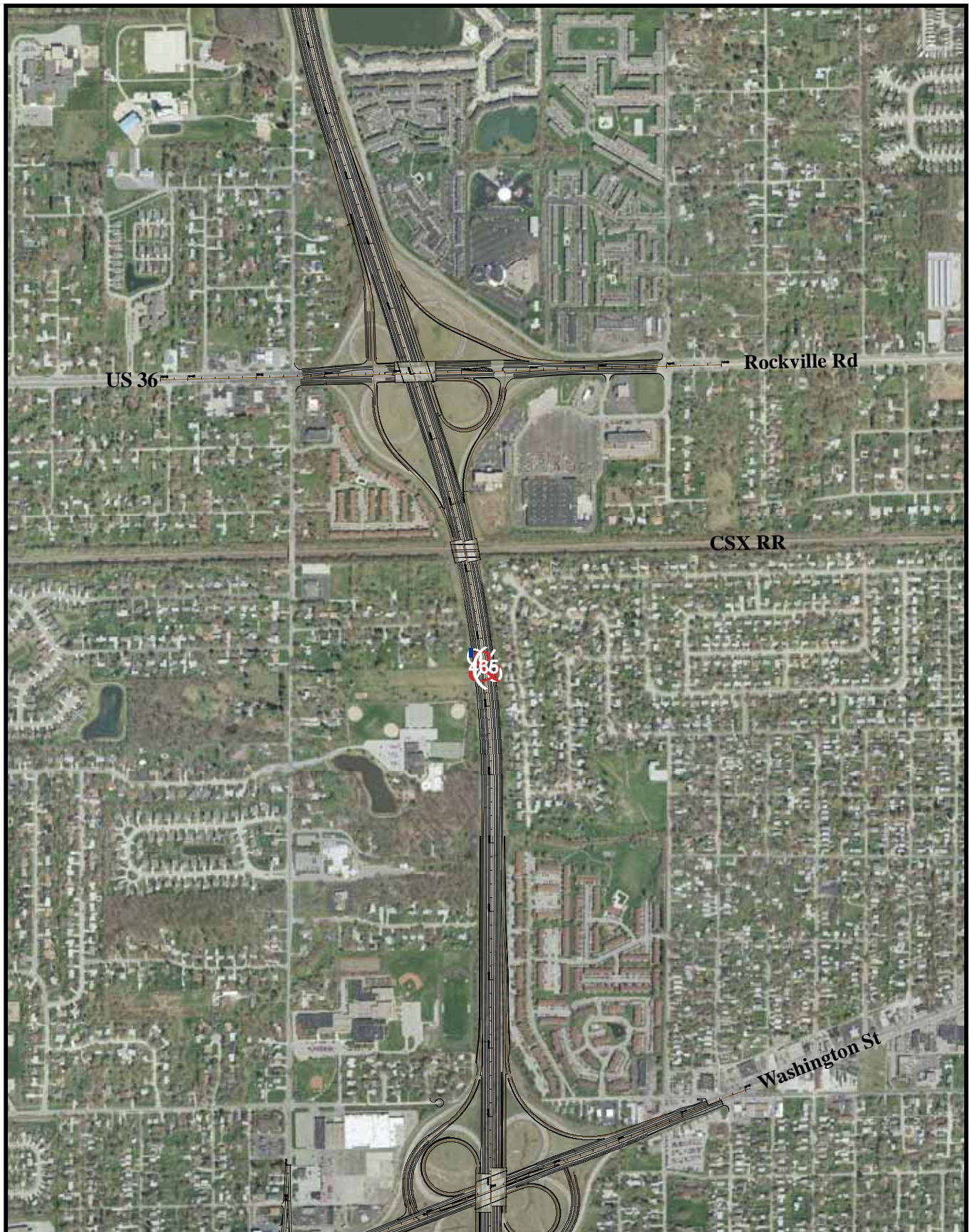
Indianapolis, Indiana



Appendix A - 2: Future Conditions PM_{2.5} Qualitative Hot-Spot Analysis

I-465 West Leg Reconstruction Project
(SR 67/ Kentucky Avenue to 56th Street)

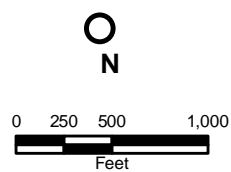
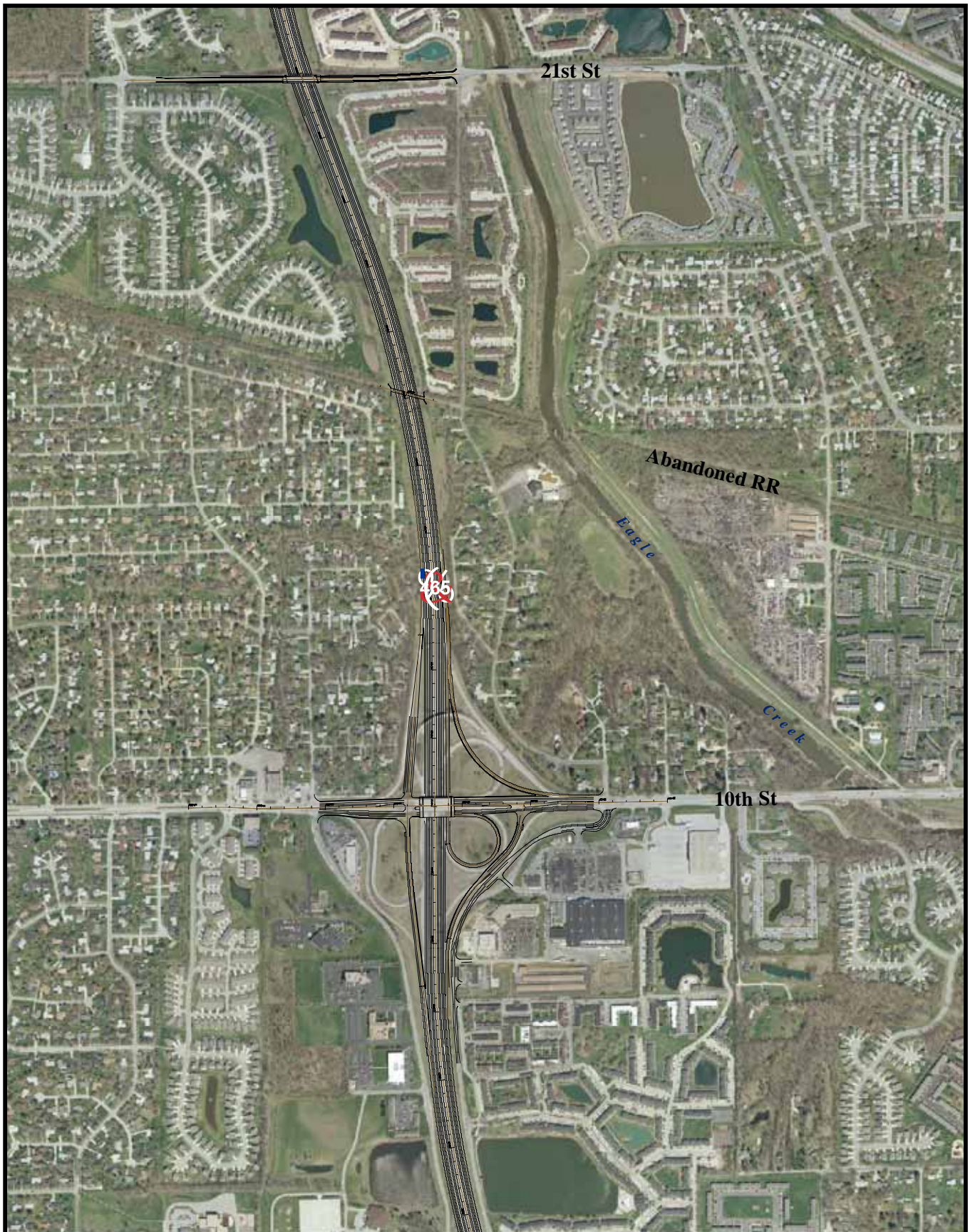
Indianapolis, Indiana



Appendix A - 3: Future Conditions PM_{2.5} Qualitative Hot-Spot Analysis

I-465 West Leg Reconstruction Project
(SR 67/ Kentucky Avenue to 56th Street)

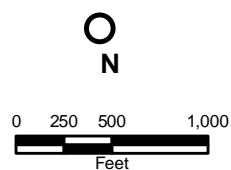
Indianapolis, Indiana



Appendix A - 4: Future Conditions PM_{2.5} Qualitative Hot-Spot Analysis

I-465 West Leg Reconstruction Project
(SR 67/ Kentucky Avenue to 56th Street)

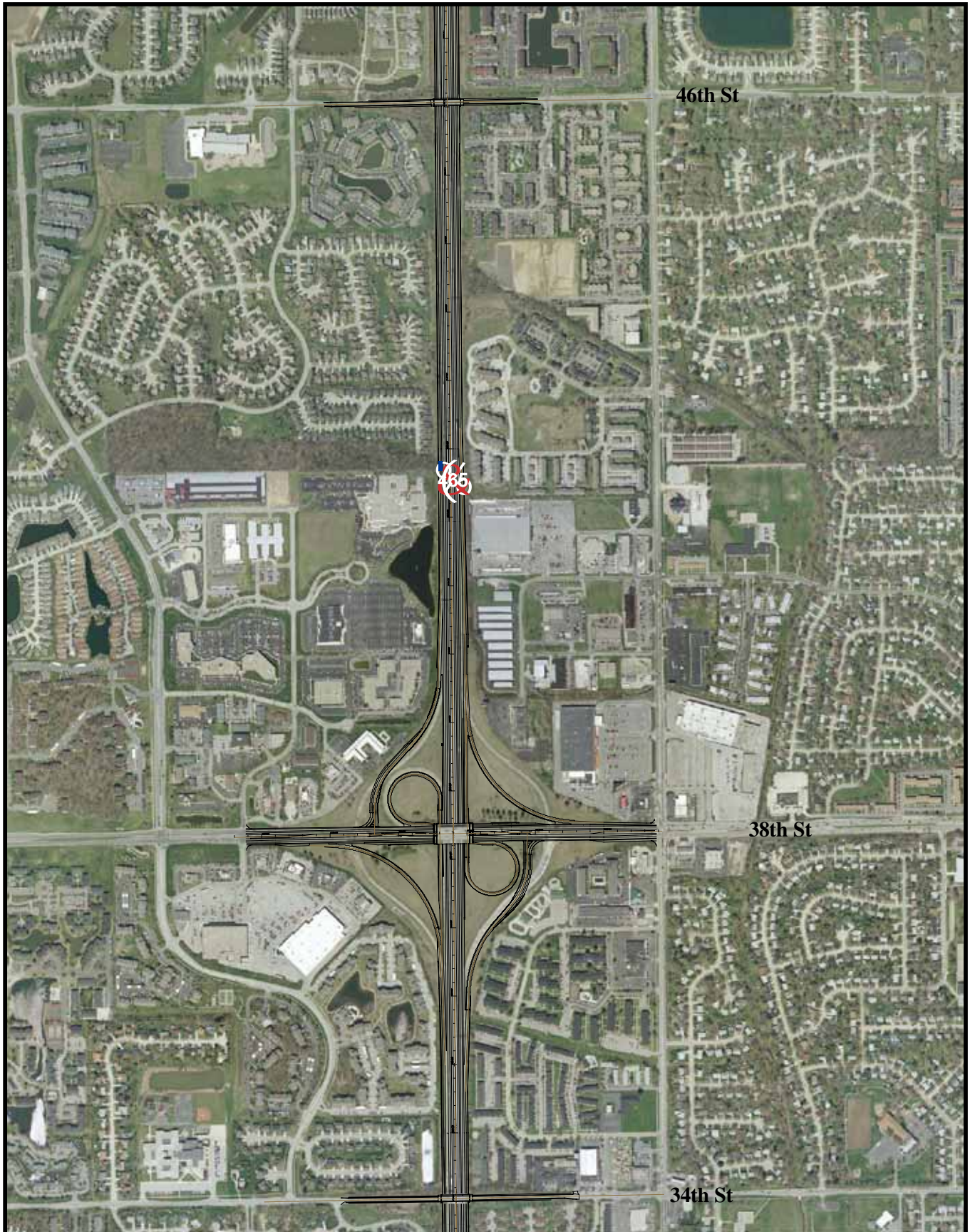
Indianapolis, Indiana



Appendix A - 5: Future Conditions PM_{2.5} Qualitative Hot-Spot Analysis

I-465 West Leg Reconstruction Project
(SR 67/ Kentucky Avenue to 56th Street)

Indianapolis, Indiana



46th St

38th St

34th St

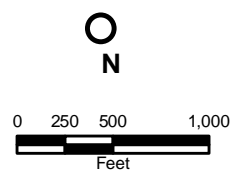
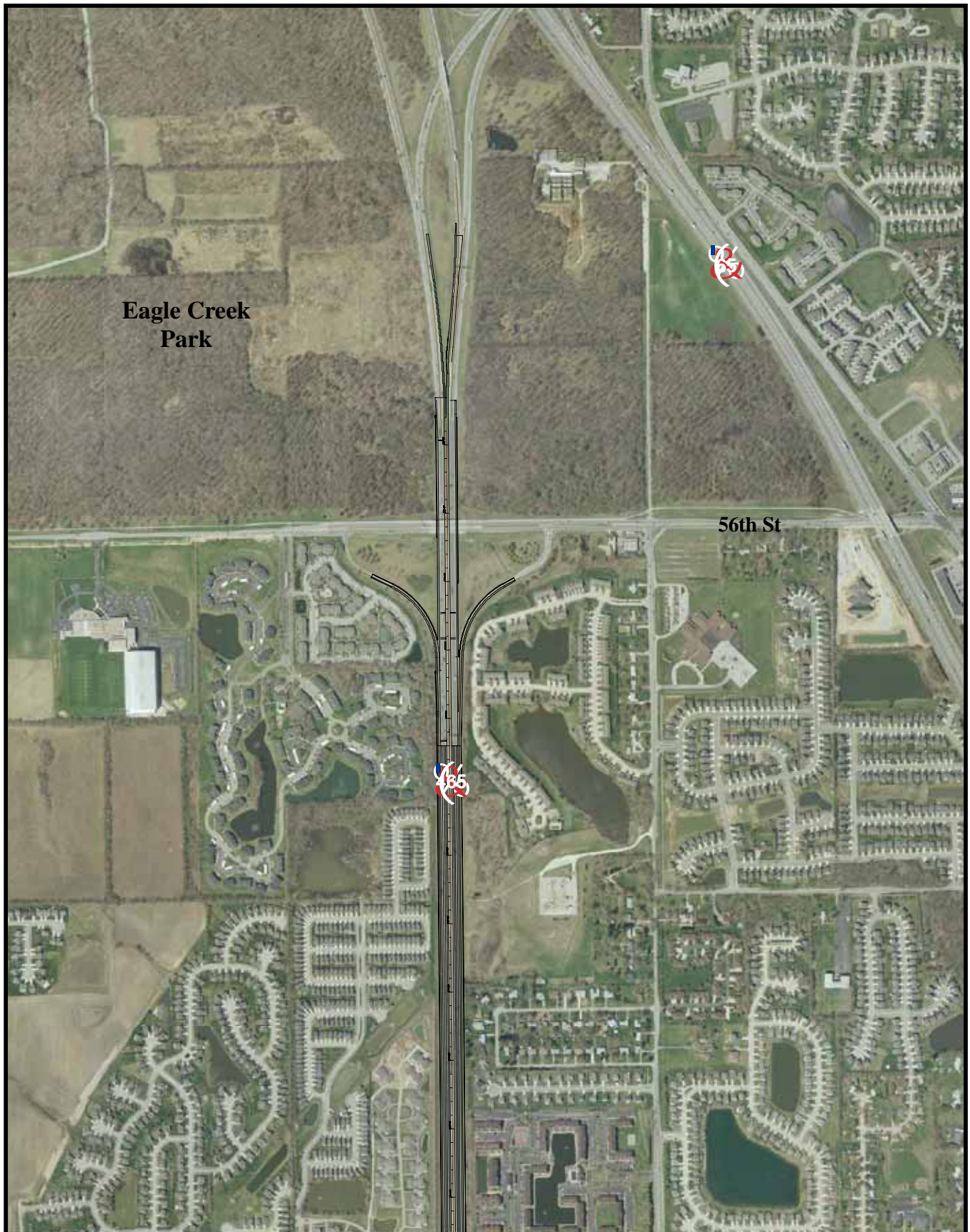


0 250 500 1,000
Feet

Appendix A - 6: Future Conditions PM_{2.5} Qualitative Hot-Spot Analysis

I-465 West Leg Reconstruction Project
(SR 67/ Kentucky Avenue to 56th Street)

Indianapolis, Indiana



Appendix A - 7: Future Conditions PM_{2.5} Qualitative Hot-Spot Analysis

I-465 West Leg Reconstruction Project
(SR 67/ Kentucky Avenue to 56th Street)

Indianapolis, Indiana